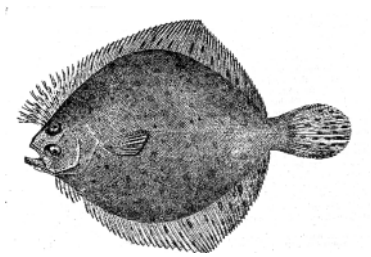

Windowpane Flounder

by

Lisa Hendrickson

Windowpane or sand flounder, *Scophthalmus aquosus*, is a thin-bodied, left-handed flatfish distributed on the northwest Atlantic continental shelf from the Gulf of St. Lawrence to Florida. This species inhabits large estuaries and is also commercially abundant to depths of 56 m (30 fathoms) on Georges Bank and in Southern New England. Sexual maturity occurs between ages 3 and 4. Spawning occurs from April through December in Mid-Atlantic Bight waters, with peaks in May and October; and during summer on Georges Bank, where peak activity occurs in July and August.

No stock structure information is available. Therefore, a provisional arrangement has been adopted that recognizes two stock areas based on apparent differences in growth, sexual maturity, and abundance trends in fish from Georges Bank and from Southern New England. The proportions of total landings contributed by the Gulf of Maine and Mid-Atlantic areas are low (less than 7%), so data from these areas are combined with those from Georges Bank and Southern New England, respectively.

This species is managed under the New England Fishery Management Council's Northeast Multispecies Fishery Management Plan (FMP). Under this FMP windowpane flounder are included in a complex of 15 groundfish species which has been managed by time/area closures, gear restrictions, minimum size limits, and, since 1994, direct effort controls including a moratorium on permits and days-at-sea restrictions under Amendments 5 and 7 to the FMP. Amendment 9 to the FMP established biomass rebuilding targets, and defines control rules which specify target fishing mortality rates and corresponding rebuilding time horizons. The goal of the management program is to reduce fishing mortality to levels which will allow stocks within the complex to initially rebuild above minimum biomass thresholds, and, ultimately, to remain at or near target biomass levels.

The principal commercial fishing gear for windowpane flounder is the otter trawl. Recreational and foreign catches are insignificant. Commercial exploitation of windowpane flounder began during 1943-1945, and until 1975, windowpane was harvested as part of an industrial fishery. Landings records for this species date back to 1975, when landings totaled 2,000 mt. Combined landings for both stocks reached a peak of 4,200 mt in 1985 and then fluctuated between 2,000 mt and 3,700 mt during 1987-1991. Subsequently, landings declined sharply and have averaged less than 1,000 mt annually since 1994.

Gulf of Maine-Georges Bank

Since 1991, approximately 75% of the total windowpane landings have been harvested from the Gulf of Maine-Georges Bank area. Following a 1991 record high of 2,900 mt, landings declined to a record low

in 1994 (300 mt) and fluctuated between 400 and 700 mt during 1995-1998. High landings during the early 1990s probably reflect an expansion of the fishery to offshore areas, as well as the targeting of windowpane flounder as an alternative to depleted groundfish stocks. NEFSC autumn bottom trawl survey indices generally declined between1984 and 1992, but have since increased. The 1996-1998 autumn mean weight per tow index (= 0.86 kg/tow) is above the minimum biomass threshold of 0.47 kg/tow established by the Amendment 9 control rule, and near the target biomass level (B_{MSY} proxy = 0.94 kg/tow). This implies that the stock was not in an overfished condition. The average relative exploitation index during 1996-1998 (= 0.58) was below the corresponding threshold fishing mortality rate proxy of 0.84 and near the target, which implies that overfishing was not occurring.

Summary Status

Long-term potential catch (MSY)[1]	=	1,000 mt
Biomass corresponding to MSY [2]	=	B_{MSY} proxy = 0.94 kg/tow
Minimum biomass threshold	=	$^1/_2$ B_{MSY} proxy = 0.47 kg/tow
Stock biomass in 1996-1998 [3]	=	0.86 kg/tow (Implies stock was not overfished)
F_{MSY} -proxy [4]	=	1.11
F_{TARGET} [5]	=	0.67
$F_{TARGET1996-98}$	=	0.54
Overfishing definition	=	$F_{THRESHOLD1996-98}$ [6] = 0.84
$F_{1996-98}$ [7]	=	0.58 (Implies overfishing was not occurring)
Age at 50% maturity	=	3.0 years
Size at 50% maturity	=	22.2 cm (8.7 in.), males 22.5 cm (8.9 in.), females
Assessment level	=	Index
Management	=	Northeast Multispecies FMP

M=Unknown **$F_{0.1}$**= Unknown **F_{max}**= Unknown

[1] Proxy based on sustainable landings trends.

[2] Proxy based on 1975-1987 median of autumn bottom trawl survey mean weight per tow.

[3] Based on 1996-1998 average of autumn survey mean weight per tow.

[4] Proxy based on relative exploitation index (landings/autumn survey mean weight per tow).

[5] When B exceeds B_{MSY} proxy, defined as 60% of F_{MSY} proxy (= 0.67).

[6] $F_{THRESHOLD}$ = F_{MSY} proxy = 1.11 when biomass exceeds B_{MSY} proxy. When biomass declines below B_{MSY} proxy, $F_{THRESHOLD}$ and F_{TARGET} decrease linearly to zero at ½ B_{MSY} proxy.

[7] Average relative exploitation index during 1996-1998

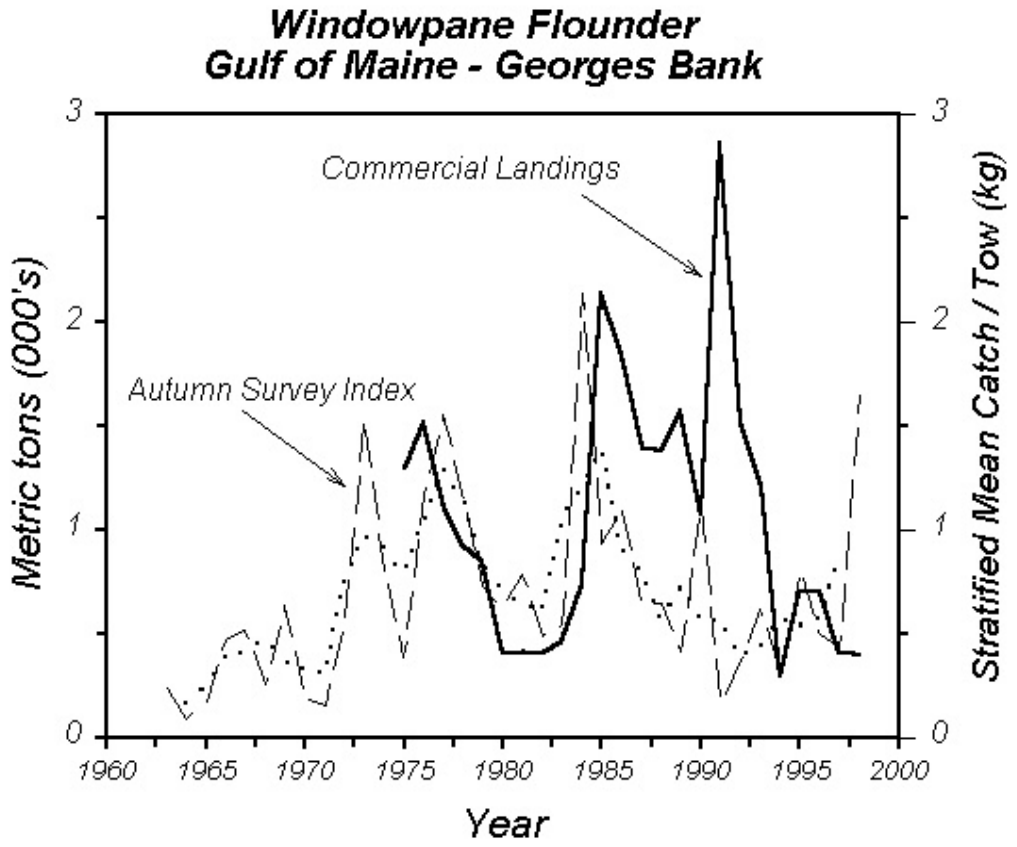

Table 12.1 Recreational catches and commercial landings (thousand metric tons)

	Year										
Category	**1979-88 Average**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
U.S. recreational	-	-	-	-	-	-	-	-	-	-	-
Commercial											
United States	1.0	1.6	1.1	2.9	1.5	1.2	0.3	0.7	0.7	0.4	0.4
Other	-	-	-	-	-	-	-	-	-	-	-
Total nominal catch	1.0	1.6	1.1	2.9	1.5	1.2	0.3	0.7	0.7	0.4	0.4

Southern New England-Middle Atlantic

Commercial landings from this region exceeded those from the Gulf of Maine-Georges Bank region during 1980-1984, and reached a record-high of 2,100 mt in 1985. Landings have since declined from 1,200 mt in 1988 to a record low of 100 mt in 1995. During 1991-1993, landings from this area were only 25% of those from the Gulf of Maine-Georges Bank region. During 1996-1998, landings were between 100 and 200 mt. The NEFSC autumn bottom trawl survey indices have declined since the early 1980s to record low levels. The 1996-1998 autumn mean weight per tow index (= 0.19 kg/tow) is above the minimum biomass threshold of

0.10 kg/tow established by the Amendment 9 control rule. Thus, the stock is not classified as overfished, although biomass is very low. The average relative exploitation index during 1996-1998 (= 0.75) was above the corresponding threshold fishing mortality rate proxy of 0.65 which implies that overfishing was occurring during this time period.

Summary Status

Long-term potential catch (MSY)	=	900 mt
Biomass corresponding to MSY[1]	=	B_{MSY} proxy = 0.41 kg/tow
Minimum biomass threshold	=	$^1/_4$ B_{MSY} proxy = 0.10 kg/tow
Stock biomass in 1996-1998[2]	=	0.19 kg/tow (Implies stock was not overfished)
F_{MSY} proxy[3]	=	2.24
F_{TARGET}[4]	=	1.60
$F_{TARGET1996-98}$	=	0.0
Overfishing definition	=	$F_{THRESHOLD1996-98}$[5] = 0.65
$F_{1996-98}$[6]	=	0.75 (Implies overfishing was occurring)
Age at 50% maturity	=	3.0 years
Size at 50% maturity	=	21.5 cm (8.5 in.), males 21.2 cm (8.4 in.), females
Assessment level	=	Index
Management	=	Northeast Multispecies FMP

M = Unknown **$F_{0.1}$** = Unknown **F_{max}** = Unknown

[1] Proxy based on autumn bottom trawl survey mean weight per tow equivalent.

[2] Based on 1996-1998 average of autumn bottom trawl survey mean weight per tow.

[3] Proxy based on relative exploitation index (landings/autumn survey mean weight per tow)

[4] For B above $B_{MSY,}$ based on 80th percentile of F_{MSY} bootstrap estimates (1.60).

[5] $F_{THRESHOLD}$ = F_{MSY} proxy = 2.24 when biomass equals or exceeds B_{MSY} proxy; when B declines below B_{MSY} proxy, $F_{THRESHOLD}$ decreases linearly to zero at $^1/_4$ B_{MSY} proxy, while F_{TARGET} decreases linearly to zero at ½ B_{MSY} proxy.

[6] Average relative exploitation index during 1996-1998.

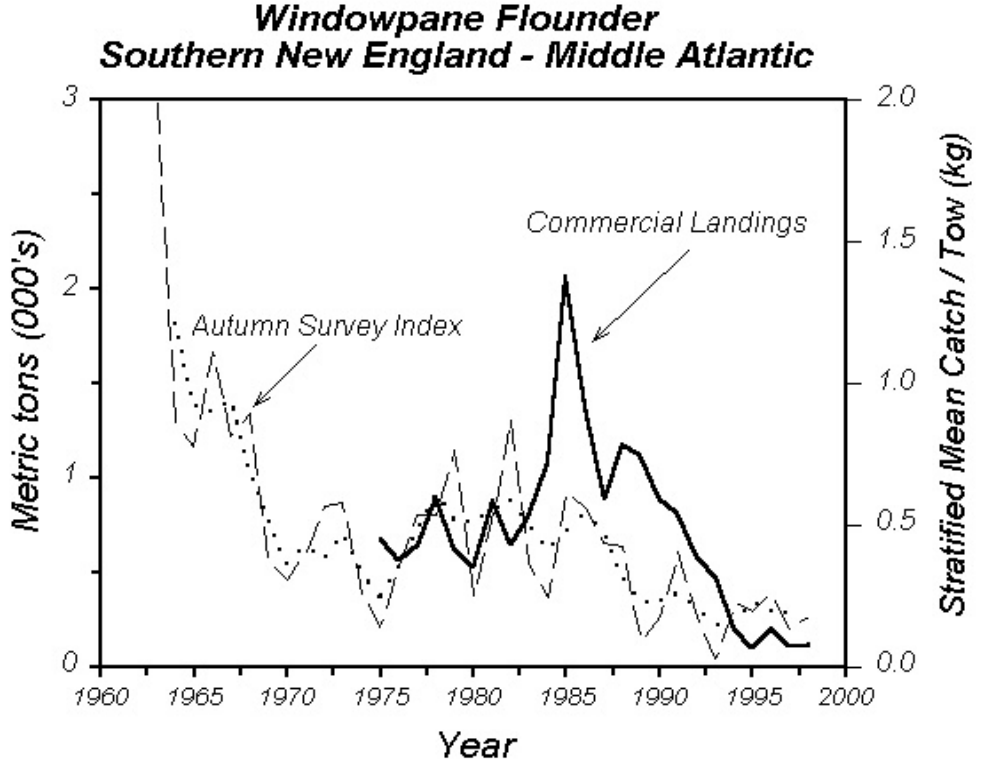

Table 12.2 Recreational catches and commercial landings (thousand metric tons)

	Year										
Category	**1979-88 Average**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
U.S. recreational	-	-	-	-	-	-	-	-	-	-	-
Commercial											
United States	1.0	1.1	0.9	0.8	0.6	0.5	0.2	0.1	0.2	0.1	0.1
Other	-	-	-	-	-	-	-	-	-	-	-
Total nominal catch	1.0	1.1	0.9	0.8	0.6	0.5	0.2	0.1	0.2	0.1	0.1

For further information

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